

# Instruction Guide

## Tracker DTS Instruction Guide



Backcountry Access, Inc. 2820 Wilderness Place, Unit H Boulder, CO 80301 USA  
303 417 1345 [www.bcaccess.com](http://www.bcaccess.com) [info@bcaccess.com](mailto:info@bcaccess.com)

## **-Tracker DTS Instruction Guide -**

The Tracker DTS Instruction Guide is a resource for avalanche educators and others teaching on-snow transceiver use. The objective is to help educators teach students how to properly use the Tracker DTS. However, this guide is equally applicable to other digital beacons and can be used for general avalanche transceiver training, whatever the brand. The guide is most effective when used with the BCA flux diagram and our beacon training video, "Tracker 101." These can be ordered from BCA by calling (800)670-8735.

As a supplement to the Instruction Guide, we offer the Tracker DTS Advanced Tutorial. This provides detailed instructions on advanced techniques not included in our owner's manual and generally not taught in recreational avalanche courses. This can also be obtained by calling BCA or by downloading from our website at [www.bcaccess.com/education/teaching.php](http://www.bcaccess.com/education/teaching.php).

### **Instruction principles**

- Try not to tell a student what to do. Whenever possible, show them.
- Do not assume they have learned what you've taught them; they should be able to demonstrate their understanding.
- Get the Tracker into the hands of the student and get them practicing. Five minutes of use in the field (or sandlot) is more effective than far greater time in the classroom.
- Novices are often intimidated by beacon technology and professionals are often biased toward analog technology. The faster you get a transceiver into their hands and using it, the sooner you will break down those phobias.
- When teaching recreationists, the objective is to build confidence by enabling them to succeed in performing a basic single beacon search.
- Only go into advanced search technique once students are practiced in the fundamentals.

### **Instruction setup**

For maximum teaching efficiency, hold your training at a Beacon Basin transceiver training park. For more information on this program, see [www.bcaccess.com/beaconbasin](http://www.bcaccess.com/beaconbasin).

Target audience for basic instruction

- First-time beacon users
- Heli and snowcat clients
- Rental customers
- Professionals using a digital beacon for the first time

## Familiarization

Demonstrate the following:

- Wearing the transceiver properly under outer layer
- Deploying and extending for searching
- Turning it on, checking battery power, going into transmit
- Going into search mode
- Going back into transmit mode

## Lesson I: Single Burials

### A) Explain the three elements of the search:

- Primary/signal/coarse search: detect the signal.
- Secondary/fine search: get close to the buried beacon.
- Pinpoint search: define the smallest possible probe/dig area.

### B) Primary search

If time does not permit, then it is not essential for students to practice the primary search during this phase of the clinic. However, a brief introduction should be provided, and they should become familiar with the search strip width of their transceiver. Use the diagram on the back side of the vinyl BCA flux diagram to illustrate the three phases of the transceiver search.

**Effective Range:** The "worst case," or "effective" range is 10 meters for the Tracker DTS and most other digital avalanche beacons. Allow a maximum of 10 meters between the searcher and the edge of the slide path.

**Search Strip Width:** Allow a maximum of 20 meters (or twice the effective range) between searchers or switchbacks.

- 1) Demonstrate how to rotate the beacon back and forth on a horizontal and vertical plane while moving along your primary search pattern. By covering the vertical axis, you are more likely to pick up the signal of a vertically-oriented transmitter.
- 2) "SE" will flash in the distance window until the signal is captured.
- 3) Move as quickly as possible during the primary search. Scan the surface of the snow looking for clues such as equipment and protruding extremities.
- 4) Once you receive a signal, rotate your beacon until you engage the center search light. You have completed the primary search when you have engaged the signal on a consistent basis.

### **C) Secondary search: flux diagram usage**

Use the front side of the BCA flux diagram to illustrate the "flux" or "induction" line search. In the absence of this diagram, flux lines should be drawn in the snow.

- 1) Place a transmitting beacon horizontally on the ground, on top of the flux diagram, with the transmitting antenna attached to the Velcro at the center of the diagram.
- 2) Perform a small search for the beacon that is attached to the diagram. Perform the search on the same plane as the transmitting beacon (on top of the vinyl surface). This will eliminate the potential for "spike" signals, which are discussed in the Advanced Tutorial.
- 3) Make sure the center light is engaged and the number in the distance window is decreasing. If it is increasing, turn 180°. If the light to the right (or left) of center engages, rotate your beacon slightly to the right (or left).
- 4) Explain that all beacons follow the direction of the electromagnetic field. Perform several small searches, following the flux lines on the diagram, starting at several different points at the edge of the diagram. Show how the secondary search path can differ significantly, depending on the relative orientations of the two beacons.
- 5) Point out that when performing a secondary search with the Tracker, it is not always necessary to have the center light engaged. When the signal is first detected, it is adequate if any of the three center lights are flashing. The searcher should move very quickly to ten meters.
- 6) Inside ten meters, move slowly and deliberately, keeping the center light engaged.

An effective way to illustrate flux lines is to place a transmitter in the center of the group, preferably on the flux diagram. Have them follow the directional lights to the transmitter, then look at their footprints in the snow.

### **D) Pinpoint search**

For novices, we recommend starting with a bracket pinpoint technique, then progressing to "pinpointing on a line." For more advanced pinpoint techniques, see the Advanced Tutorial.

#### **Bracketing**

- 1) If students are wearing their beacons, demonstrate how to extend the lanyard to increase their range of motion.
- 2) Within three meters, place the beacon as close as possible to the snow surface and search in the general direction they were headed during the latter part of the secondary search. Look for the smallest distance reading.
- 3) Ignore sudden fluctuations in distance and direction. The strongest signal is often just past these fluctuation points, or "spikes."

4) Verify the smallest distance/strongest signal by maintaining the Tracker's orientation and moving it perpendicular to the point where the smallest reading is captured. More brackets can be performed until the lowest number is found. This is identical to pinpointing with an analog/audible-based beacon. When bracketing, however, it is important only to concentrate on the numeric distance readings; directional arrows should be ignored.

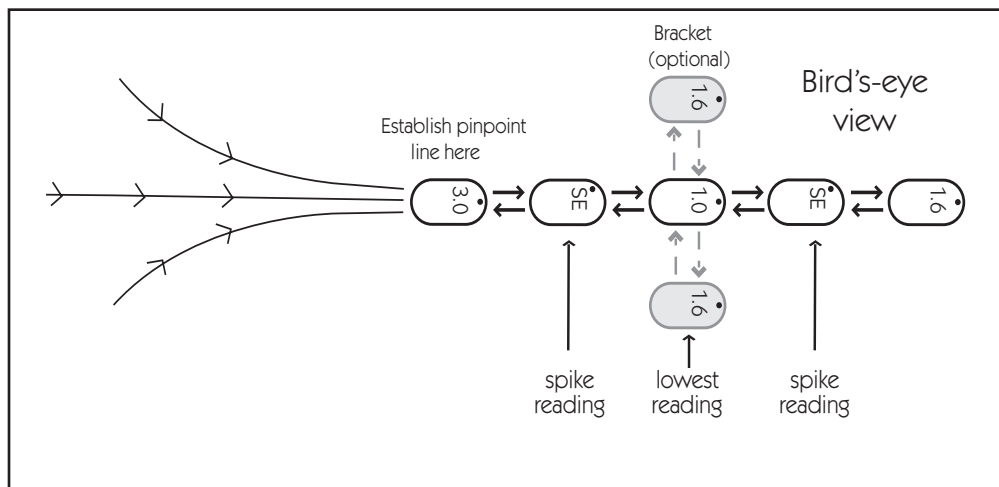
5) Begin probing at the smallest number found. We suggest an expanding spiral pattern.

### Pinpointing on a line

1) It can be helpful at this point to introduce the concept of "pinpointing on a line." If the searcher can establish a straight search path before entering the pinpoint phase, the bracketing process can be minimized. Once a straight line has been established, draw a line in the snow or place a long object (such as a probe or ski) on the snow, starting at about three meters. This enables them to limit the pinpoint search to that axis. A physical object on the snow also provides a reference point to which they can return if they become confused.

2) The key to pinpointing on a line is to establish an accurate line. Depending on the distance and direction from which you approach the buried beacon, and the orientation of that beacon, the flux line might be curved when approaching the three-meter mark. If so, back up several meters and approach from a different angle. This can be done several times until a straight approach is established (Figure 1).

3) Once the lowest distance reading is located on this line, it is helpful to bracket once to see if a lower reading can be attained on either side. This will provide for a more precise pinpoint search if the line wasn't determined precisely the first time.



4) For more precision in deep burials, it is best to first identify the "spike" reading(s), then establish the line, rather than establishing the line at three meters. This is described in the Advanced Tutorial.

### Exercise I: Exposed transmitter/supervised

Have each student conduct a secondary and pinpoint search for the transmitter on the snow surface. By leaving the transmitting beacon visible, the student will build confidence.

- 1) Follow each student one-at-a-time to make sure they are "trusting" what the beacon is telling them. A common mistake is to travel straight despite the light flashing to the left or right of center. Another common mistake is to move too fast during the pinpoint search.
- 2) Encourage them to move the Tracker slowly, not abruptly, when centering the search light. This is especially important for experienced users of analog/audible-based beacons.
- 3) Students should be encouraged to say the distance numbers aloud. This reinforces to the instructor and student that the user is looking at the distance display and is getting closer.
- 4) Have them perform the pinpoint search once using the bracketing technique only. Then have them pinpoint on a line with only a small bracket at the end.

### **Exercise II: Buried transmitter/supervised**

Perform the same exercise as above, but searching for a buried transmitter.

### **Exercise III: Buried transmitter/unsupervised (in pairs)**

Depending on the number of students, have them break into pairs and conduct secondary and pinpoint searches together. Each team of two should practice while the instructor rotates between teams. One person buries, the other searches, then switch. Maintain a distance of at least 40 meters between groups.

Timed Searches: If time permits, perform a timed contest, including all three phases of the search. Timing the searches will help simulate the stress associated with actual conditions. After pinpointing, each contestant re-hides the beacon for the next. In a flat, packed search area, a student should be able to perform a successful search in under three minutes.

## **Lesson II: Multiple Burial Searching/SE Mode**

Only teach students multiple-burial technique once they have mastered single burials. Multiple burials should only be taught in Search mode. Special mode is discussed in the Advanced Tutorial.

It is important to emphasize that whenever possible, the searcher should turn off the victim's beacon once they have been located. This limits the multiple search to a series of simple, single-burial searches. However, it is sometimes more efficient to begin searching for other victims if other companions are available to begin shoveling.

A) Illustrate the Tracker's signal-strength filtering:

- 1) Place two beacons on the snow, about 10 meters apart. Remain in Search mode. Pinpoint one transmitter, then move closer to the second. Show how the Tracker automatically isolates the second one. Distance readings should increase as you move away from the first beacon, then decrease after isolating the second.

2) If possible, use beacons of different brands as transmitters. This will allow students to experience their differing pulse rates.

B) Show how the display looks with two beacons transmitting:

1) Using the same two transmitters, begin a secondary search from at least 20 meters away. Note what the display looks like when they have both been detected. Often signals can be differentiated better by slightly changing the orientation of the Tracker until the received signals are in different directional windows.

2) Emphasize that the student should continue to strictly maintain their search strip width even after detecting a signal. This will ensure that they will not bypass a weak or poorly oriented transmitter and have to backtrack uphill after finding the first one. In a complex multiple burial, the primary search should not be abandoned until the lowest distance reading is less than 20 meters.

3) If the two signals are easily differentiated, mark this spot and perform a search for the closest beacon. Point out that you can always return to this point to search for the second victim.

C) Perform multiple search using three-circle method.

1) If the two signals are not easily identified, then introduce the three-circle method. This is the baseline method for locating multiple victims using any avalanche transceiver.

2) Abandon primary search and pinpoint first victim. Take three steps back and search for second signal in SE mode, maintaining three-meter radius around the first victim. Emphasize rotating the beacon slowly, as on the primary search. Look for sudden change in visual display and audible tones, and for sharply decreasing numbers. Test any such areas with a quick bracket.

3) If no signal is captured, take another three steps back and repeat—up to three circles (nine-meter radius).

4) Once a new signal is acquired, pinpoint by bracketing ("pinpointing on a line" is difficult in close-proximity searches).

5) After locating each victim, it is important to complete each circle if victims are still missing. Once all the circles have been searched, return to the point at which the primary search was abandoned. Continue the primary search from here if victims are still missing.

The three-circle method is an excellent technique for beginners, but requires inefficient movement through the deposition area. The Tracker's special (SP) mode enables more efficient searching in a similar circular pattern but with the searcher remaining in place and rotating the beacon rather than physically walking in circles. For more information, see Advanced Tutorial.

